AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application.

1. (currently amended) An imaging system for use in medical intervention procedure planning involving a coronary sinus, comprising:

a medical scanner system configured for generating a volume of cardiac image data using a protocol configured for imaging the coronary sinus;

a data acquisition system configured for acquiring the volume of cardiac image data;

an image generation system configured for generating at least one viewable image from the volume of cardiac image data through dynamic segmentation;

a database configured for storing information from said data acquisition and image generation systems, and for storing a 3D model of at least the dynamically segmented volume of cardiac image data ~~in a wire mesh geometric model, a solid geometric model, a set of contours associated with each image slice, a segmented volume of binary images, a run length encoded binary segmentation mask, a medical digital imaging object using a radiation therapy medical digital imaging object standard, or any combination comprising at least one of the foregoing image formats~~;

an operator interface system configured for managing at least one of said medical scanner system, said data acquisition system, said image generation system, and said database;

a post-processing system configured for analyzing the volume of cardiac image data, inserting [[a]] at least three geometric markers into the volume of cardiac image data at [[an]] corresponding anatomical landmarks, selecting a viewable parameter in response to the geometric marker at the anatomical landmark, generating [[a]] the 3D model of the volume of cardiac image data, ~~and~~ displaying the at least one viewable image, exporting

the 3D model with the at least three geometric markers to said operator interface system, and being responsive to said operator interface system; and wherein

said operator interface system comprises instructions for using and saving at least one of the volume of cardiac image data, the at least one viewable image, the anatomical landmark, the 3D model with the at least three geometric markers, and a measured viewable parameter, in at least one of a bi-ventricular pacing planning, an atrial fibrillation planning, and an atrial flutter planning procedure, that involves the coronary sinus;

thereby providing an imaging system for use in interventional procedure planning that makes available, prior to an actual medical interventional procedure, the 3D model with the at least three geometric markers for subsequent registration with an interventional system for use during a subsequent interventional procedure.

2. (original) The imaging system of Claim 1, wherein said medical scanner system comprises at least one of a CT system, a MR system, an Ultrasound system, a 3D Fluoroscopy system, and a PET system.

3. (previously presented) The imaging system of Claim 1, wherein said database includes storage for storing image data of the right atrium and the coronary sinus.

4. (previously presented) The imaging system of Claim 1, wherein said database includes storage for storing the at least one viewable image of the right atrium and the coronary sinus.

5. (previously presented) The imaging system of Claim 1, wherein said operator interface system includes instructions for segmenting the volume of cardiac image data for viewing the right atrium and the coronary sinus.

6. (original) The imaging system of Claim 5, wherein said operator interface system includes instructions for viewing the at least one viewable image in different planes.

7. (previously presented) The imaging system of Claim 5, wherein said post-processing system includes instructions for:

determining whether an arterial-phase or a venous-phase contrast study is under review;

dynamically adjusting a segmentation threshold in preparation for performing vessel tracking of the coronary sinus from the volume of cardiac image data, thereby enabling the coronary sinus to be tracked for both arterial-phase and venous-phase contrast enhanced studies; and

performing vessel tracking of the coronary sinus from the volume of cardiac image data.

8. (original) The imaging system of Claim 7, wherein said instructions further include instructions for performing vectorial vessel tracking along the centerline of the viewable image of the coronary sinus.

9. (original) The imaging system of Claim 1, wherein said post-processing system is adapted to display the at least one viewable image in at least one of a three-dimensional surface rendering, a three-dimensional inner surface rendering, a three-dimensional volume rendering, MPVR, MIP, curved reformat, lumen view, and an immersible view.

10. (previously presented) The imaging system of Claim 9, wherein said post-processing system is further adapted to display a viewable image of the heart, the coronary sinus and the right atrium.

11. (original) The imaging system of Claim 10, wherein said post-processing system is further adapted to display a geometric marker at an anatomical or external landmark.

12. (original) The imaging system of Claim 11, wherein said post-processing system is further adapted to display a viewable image of the coronary sinus in a translucent fashion and the geometric landmark in an opaque fashion.

13. (original) The imaging system of Claim 10, wherein said post-processing system is further adapted to display a first image of the heart in a translucent fashion and a second image of the coronary sinus in an opaque fashion.

14-15. (canceled)

16. (currently amended) A method for generating an image for use in medical intervention procedure planning involving a coronary sinus, comprising:

acquiring a volume of cardiac image data from a medical scanner using a protocol configured for imaging the coronary sinus;

managing the volume of cardiac image data through dynamic segmentation for viewing the coronary sinus and associated right atrium;

processing the cardiac image data for viewing;

viewing the cardiac image data in at least one viewable image;

inserting [[a]] at least three geometric markers into the volume of cardiac image data at [[an]] corresponding anatomical landmarks for subsequent visualization, analysis and registration;

selecting a viewable parameter in response to the geometric markers at the anatomical landmarks;

saving at least one of at least one viewable image, an anatomical landmark, and a measured viewable parameter, in an image database; and

generating and exporting to an image database a 3D model of at least the dynamically segmented volume of cardiac image data with the at least three geometric markers ~~in a wire mesh geometric model, a solid geometric model, a set of contours associated with each image slice, a segmented volume of binary images, a run length encoded binary segmentation mask, a medical digital imaging object using a radiation therapy medical digital imaging object standard, or any combination comprising at least one of the foregoing image formats;~~

thereby providing for interventional procedure planning that makes available, prior to an actual medical interventional procedure, the 3D model with the at least three geometric markers for subsequent registration with an interventional system for use during a subsequent interventional procedure.

17. (previously presented) The method for generating an image as set forth in Claim 16, further comprising:

generating and exporting at least one 3D model containing the saved information to an image database, the 3D model including the coronary sinus;

importing the at least one 3D model into an operator interface system;

registering the at least one 3D model with the corresponding selected anatomical landmark having the inserted geometric marker and the measured viewable parameter; and

visualizing the at least one 3D model at the operator interface system with the selected viewable parameters mapped thereon.

18. (original) The method for generating an image as set forth in Claim 16, wherein said acquiring a volume of cardiac image data further comprises:

acquiring a volume of cardiac image data using at least one of a CT system, a MR system, an Ultrasound system, a 3D Fluoroscopy system, and a PET system.

19. (canceled)

20. (original) The method of generating an image as set forth in Claim 16, wherein said processing the cardiac image data further comprises:

processing the cardiac image data for viewing at least one of a three-dimensional model, a three-dimensional surface rendering, a three-dimensional inner surface rendering, a three-dimensional volume rendering, MPVR, MIP, curved reformat, lumen view, and an immersible view.

21. (previously presented) The method of generating an image as set forth in Claim 20, wherein said processing the cardiac image data further comprises:

processing the cardiac image data for viewing the coronary sinus and associated right atrium.

22. (original) The method of generating an image as set forth in Claim 21, further comprising:

performing vessel tracking of the coronary sinus from the volume of cardiac image data.

23. (original) The method of generating an image as set forth in Claim 22, further comprising:

performing vectorial vessel tracking along the centerline of the immersible view of the coronary sinus.

24. (previously presented) The method of generating an image as set forth in Claim 16, wherein said inserting a geometric marker into the volume of cardiac image data further comprises:

inserting a geometric marker at an anatomical landmark identifying at least one substructure of the coronary sinus and associated right atrium.

25. (original) The method of generating an image as set forth in Claim 16, wherein said selecting a viewable parameter further comprises:

selecting a viewable parameter of the coronary sinus vessel wherein the viewable parameter comprises at least one of a vessel diameter, a vessel segment path length, and a degree of vessel curvature.

26. (original) The method of generating an image as set forth in Claim 25, further comprises:

measuring the viewable parameter.

27. (original) The method of generating an image as set forth in Claim 24, wherein said viewing the cardiac image data further comprises:

viewing the at least one viewable image of the coronary sinus in a translucent fashion and viewing the geometric landmark in an opaque fashion.

28. (original) The method of generating an image as set forth in Claim 16, wherein said viewing the cardiac image data further comprises:

viewing an image of the heart in a translucent fashion and viewing an image of the coronary sinus in an opaque fashion.

29. (canceled)

30. (original) The method of generating an image as set forth in Claim 17, wherein said visualizing the 3D model further comprises:

viewing the 3D model in different planes.

31-33. (canceled)

34. (previously presented) The method for generating an image as set forth in Claim 16, further comprising:

determining whether an arterial-phase or a venous-phase contrast study is under review; and

in response to a venous-phase contrast study being under review, filtering the volume of cardiac image data to remove heart chamber blood pools.

35. (previously presented) The method for generating an image as set forth in Claim 34, further comprising:

in response to an arterial-phase contrast study being under review, determining whether high quality tracking is to be performed;

if high quality tracking is to be performed, filtering the volume of cardiac image data to remove heart chamber blood pools and high intensity coronary arteries; and

if high quality tracking is not to be performed, selecting a low intensity segmentation threshold in preparation for performing vessel tracking of the coronary sinus from the volume of cardiac image data.

36. (previously presented) The method for generating an image as set forth in Claim 16, further comprising:

determining whether an arterial-phase or a venous-phase contrast study is under review; and

dynamically adjusting a segmentation threshold in preparation for performing vessel tracking of the coronary sinus from the volume of cardiac image data, thereby enabling the coronary sinus to be tracked for both arterial-phase and venous-phase contrast enhanced studies.

37. (previously presented) The method for generating an image as set forth in Claim 16, wherein the managing the volume of cardiac image data comprises:

managing the volume of cardiac image data through dynamic segmentation.

38. (previously presented) A method for generating an image for use in medical intervention procedure planning involving the coronary sinus, comprising:

determining from an acquired volume of cardiac image data, the cardiac image data having been received using a medical scanner and a protocol configured for imaging the coronary sinus, whether an arterial-phase or a venous-phase contrast study is under review; and

dynamically adjusting a segmentation threshold in preparation for performing vessel tracking of the coronary sinus from the volume of cardiac image data, thereby enabling the coronary sinus to be tracked for both arterial-phase and venous-phase contrast enhanced studies.

39. (previously presented) The method of Claim 38, further comprising:

processing the cardiac image data for viewing, including viewing of the coronary sinus;

viewing the cardiac image data in at least one viewable image;

inserting a geometric marker into the volume of cardiac image data at an anatomical landmark for subsequent visualization, analysis and registration;

selecting a viewable parameter in response to the geometric marker at the anatomical landmark; and

saving at least one of at least one viewable image, an anatomical landmark, and a measured viewable parameter, in an image database.

40. (currently amended) The imaging system ~~method~~ of Claim 1, wherein:

said post-processing system is also configured for blending the volume of cardiac image data with the inserted geometric marker into an interventional system for registration therewith, thereby enabling use of the volume of cardiac image data with the inserted geometric marker during an interventional procedure on a patient.

41. (previously presented) The method of Claim 38, further comprising:

acquiring the cardiac image data using a medical scanner and a protocol configured for imaging the coronary sinus during an arterial-phase contrast study, a venous-phase contrast study, or both.

42. (currently amended) The imaging system ~~method~~ of Claim 1, wherein:

the protocol configured for imaging the coronary sinus comprises helical scan data acquisition with gated reconstruction.

43. (new) The imaging system of Claim 1, wherein the post-processing system comprises an algorithm for automatically adjusting a dynamic segmentation threshold, and wherein the algorithm is adapted for ensuring tracking of the coronary sinus during at least one of an arterial contrast enhanced study and a venous-phase contrast enhanced study.

44. (new) The method for generating an image as set forth in Claim 16, further comprising:

establishing a brightness for the image prior to the dynamic segmentation.

45. (new) The method for generating an image as set forth in Claim 16, further comprising:

automatically distinguishing between the different image contrasts of an arterial contrast enhanced study and a venous-phase contrast enhanced study.

46. (new) The method for generating an image as set forth in Claim 16, wherein generating the 3D model comprises:

performing segmentation of cardiac image volume data to define a subvolume or 3D model of a substructure.

47. (new) The method for generating an image as set forth in Claim 16, further comprising automatically adjusting a dynamic segmentation threshold value.

48. (new) The imaging system of Claim 1, wherein:

the database is further configured for storing the 3D model in an image format comprising at least one of a wire mesh geometric model, a solid geometric model, a set of contours associated with an image slice, a segmented volume of binary images, a run-length encoded binary segmentation mask, a medical digital imaging object using a radiation therapy medical digital imaging object standard, and a combination comprising at least one of the foregoing image formats.

49. (new) The method of Claim 16, wherein:

generating and exporting further comprises generating and exporting the 3D model in a format comprising at least one of a wire mesh geometric model, a solid geometric model, a set of contours associated with an image slice, a segmented volume of binary images, a run-length encoded binary segmentation mask, a medical digital imaging object using a radiation therapy medical digital imaging object standard, and a combination comprising at least one of the foregoing image formats.